A Study of School Grounds for the

Schools of Michigan

By the State Superintendent of Public Instruction

Bulletin No. 11
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SCHOOL GROUNDS.

Our whole system of education exists primarily for the benefit of the child. Therefore the child must be interested in and have a share in everything connected with the school. Unless we can arouse the interest and sympathy of the child and make him feel that he has a part to perform in the great work of education he will reap but little advantage from the public schools. One's training for the work of life is begun in the home and continued in the schoolroom, and the child as he develops into manhood should have healthful and beautiful surroundings if his future is to be healthful, happy, and progressive.

Educational training is the result of a direct and conscious effort on the part of the parent and teacher combined with the indirect result of the surroundings in which the child is placed. The environment of the child exerts a greater influence on his life than we sometimes think and it is unfortunate that school surroundings at least are not always such as conduce to a proper desire on his part to be helpful and a still more important desire for better things. **Educational Training.**

The child may be forced to go to school but he likes school only when it is worth liking, and it is not until he likes it that he learns. The most costly school apparatus will not atone for a cheerless schoolroom and grounds. If daily surrounded by those influences that elevate and tend to cleanliness and good order, that cultivate a love of flowers, good pictures, and proper decorations he will soon reach that degree of culture where nothing else will please him and when he grows up and has a home of his own, the effect of early training will then be seen in the clean, neat yards, good pictures on the walls, shade trees, and flowers properly arranged around the buildings. These things will be demanded because he has been brought up to be happy in no other environment.

A trip through the rural school districts of the State will convince the most doubting that one of the chief causes of the decline of the rural school is that the schoolhouse and its grounds are bare, harsh, cheerless, unattractive, and sometimes immodest. To require that eight months in each year be spent amid such surroundings is enough to chill any desire on the part of the child for education and to destroy completely all love for the beautiful. He naturally loves the beautiful, often seeing beauties in nature that are unobserved by the more mature eye and mind. In childhood the mind is impressionable and whether it is realized or not the discomforts of the average schoolroom, the lack of harmony and beauty in its adorn- **Rural Schools.**

ment, the rough and uncouth school grounds and outbuildings will, consciously or unconsciously, make a deep and lasting impression on the mind and tend to loose habits, a lack of respect for law and the rights of others, and above all a lack of care for the property of the public.

Because in the early days most of the school districts in the State were organized when the forests had not yet been cleared away, the people did not appreciate the value of a good sized school lot, nor the value of trees and shrubbery, but they are now beginning to understand and regard these things. That this is true is shown by the organization of the State Forestry Commission which is making strenuous efforts to re-forest large tracts of land.

Value of Trees.

If we are to secure from our rural schools the results that all the people really desire there must be a radical change in the attitude of the people toward the school and especially toward school property. Many farmers have their orchards and buildings surrounded by well kept groves, neat shrubbery, and flower beds in the door yard, and it is not uncommon to find beautiful and well kept lawns around farmers' homes. It is my opinion that the time has come when the people of Michigan should interest themselves in school environment and by well directed efforts afford an opportunity for the child to study the beauties of nature at first hand.

The two following cuts show the conditions of more than half the rural schoolhouses and grounds of the State of Michigan. Possibly the reader has noticed some of them:

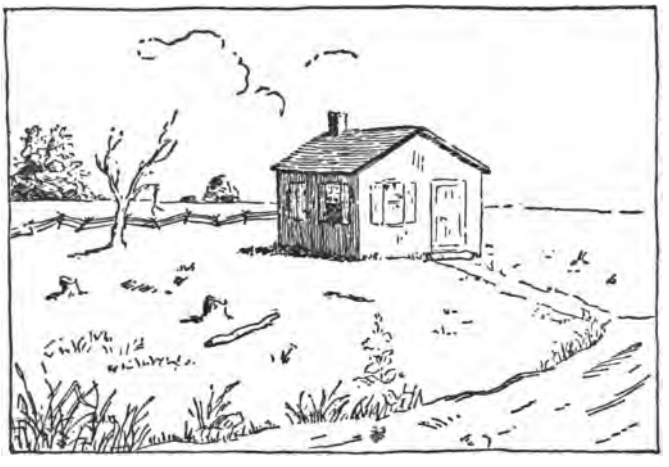


Fig. 1.

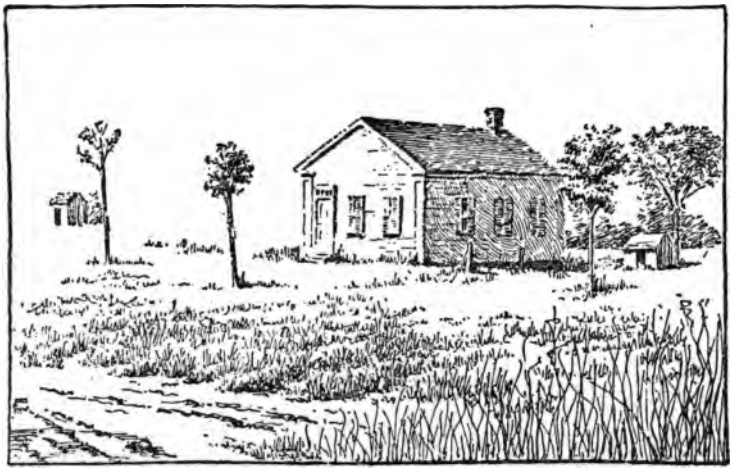


Fig. 2.

The cuts immediately following show what the conditions of the school grounds may be with a little care, forethought, and exertion on the part of the patrons of the school, the teacher, and children:

Fig. 3.
District No. 5, Antwerp Township, Van Buren County.
Perry Mason Co. Prize.

Fig. 4.
District No. 4, Duplain Township, Clinton County.
Perry Mason Co. Prize.

Fig. 5.
District No. 5, Hamilton Township, Gratiot County.
Perry Mason Co. Prize.

Fig. 6.

District No. 3, Moscow Township, Hillsdale County

Fig. 7.
District No. 1, Frl., Adams Township, Hillsdale County.

Fig. 8.
District No. 1, Adams, Township, Hillsdale County.

Fig 9.
A FRONT YARD.
District No. 2, Bangor Township, VanBuren County.

SIZE OF GROUNDS.

The average size of the rural school lot is about a half an acre. If the school were merely a place for assigning and hearing lessons a comparatively small area would be sufficient for the school ground, but with the enlarged idea of the mission of the school as the center of a many-sided, busy life of study and recreation, of social and moral influences, of the learning of many things quite as important as the knowledge of books, larger school grounds are imperatively demanded. The school ground is a place where the elementary problems of society and citizenship are worked out through the free and unhampered action of the children at study and at play. We must realize that proper recreation and exercise including helpful plays, constitute an important element in a child's education. They cannot safely be hampered even for the purpose of preserving beautiful lawns and artistic flower beds. A good sized playground will afford an opportunity to add vigor and activity to the life of the child and afford him an opportunity to be alert, active, and thoughtful in his contact with his fellows. The school ground should afford no possible opportunity for contamination, physical or moral.

Moral and Social Problems.

If we admit these statements we must conclude that an acre of ground is small enough and that from two to three acres would be much better. In discussing this question the grounds for our city and village schools will not be dealt with particularly, for our people in villages and cities have learned the value of parks and playgrounds and the value of their proper ornamentation to a greater extent than have the people in the rural communities. These suggestions therefore, will apply more directly to beautifying and adorning rural school grounds.

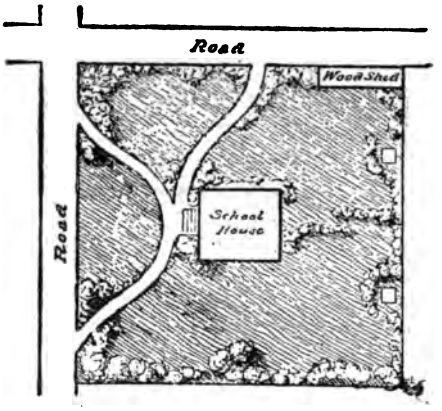
The friends of this movement must have a clear conception of the necessity of larger school grounds and they must lose no opportunity to convince all persons who are interested in the public schools (and that includes every man, woman, and child) of the necessity of a definite plan, for carrying out improvements along these lines. When the citizens of any community are aroused as to the necessity of accomplishing any desired object a way can always be easily found.

As has been stated every rural school ground should contain not less than one acre of land and I would advise two acres in every case.

PLAN OF THE GROUNDS.

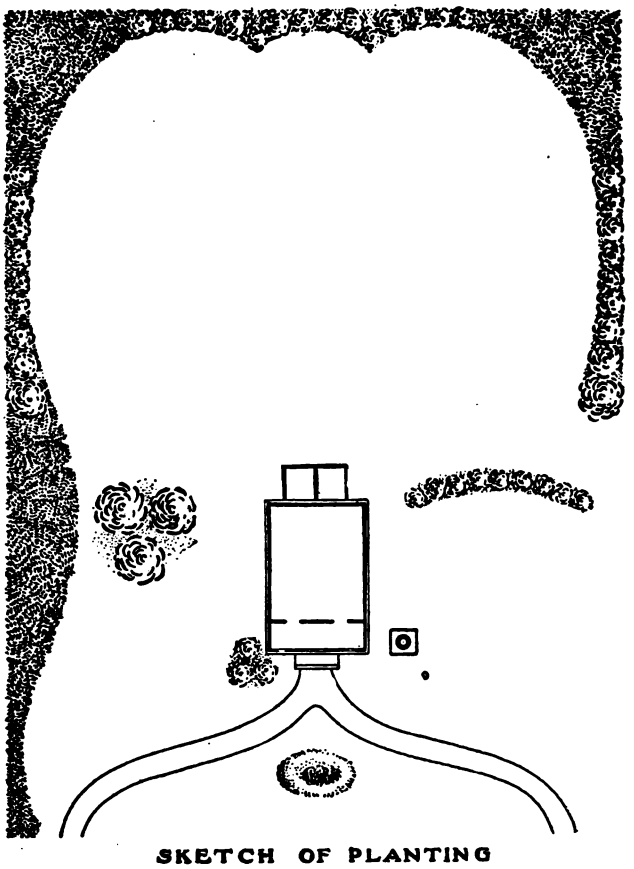
In laying out the grounds the plan will depend upon their location, as the arrangement will not be the same for a corner lot as would be best for a lot that simply fronts on the street. If the lot is on the corner there should be a good substantial fence on the two sides that adjoin other property. If the lot fronts on the street then a fence on three sides is necessary. If the lot is longer on the street than it is deep the house should be located at one end so as to leave the other for a playground. If the lot is on a corner it would be best to have the house nearer the street, thus leaving the playground in the rear of the building. The same plan is best if the lot is deeper than it is wide.

In the cuts which follow it will be noticed that this plan is usually carried out:



Suggestions for the planting of a school-yard upon four corners. From "Lessons with Plants."

Fig. 10.



SKETCH OF PLANTING

DIAGRAM No. 2.

Fig. 11.

Attention is also called to the location of walks and drives. Unless the house is very near to the front of the lot I would not advise a straight walk from the street to the house, but rather a double walk in the form of a curve leaving an opportunity for a fine lawn. These walks should be made of cement or fine gravel. The drives should be made of gravel and kept well rounded and smooth. In making a gravel walk or a gravel drive the earth should be excavated to a depth of twelve or eighteen inches. Then in the bottom fine sand should be placed and well pounded. Upon this may be placed the gravel which has previously been carefully screened. The surface of the walk or drive should be slightly above the surface of the lawn.

Walks and Drives.

In planning the grounds, as I have indicated in the foregoing, we should begin with the fundamentals, that is, the grading of the ground, locating buildings, drives and walks. When we have "blocked out" the plan it is not difficult to gradually work in the details. It is wrong to plant trees, shrubs, and flowers in the grounds first and then begin the grading and the locating of the buildings.

For grading I would suggest that unless the grounds are very uneven very little should be attempted more than to level down knolls and fill up small hollows. If, of course, the grounds are naturally uneven then they should be carefully and scientifically graded. In doing this the location of the building should be the highest spot and the ground should gently slope away from the building in every direction. If the soil is heavy it should be well drained by the use of tile.

Grading and Seeding.

After the grading will come the seeding and this may be done either by sodding the lot immediately about the house or by sowing grass seed and giving it proper care until it is well rooted. For a lawn in front of the building the plan of sodding is usually the most satisfactory. This grading and seeding may easily be done by means of a "bee" for improving the grounds if the people would prefer doing this to hiring someone to do the work. The advantage of this plan is that all will be interested.

When the grounds have been graded and seeded and fenced the next question will be the planting of trees, shrubbery, etc. It may not be out of place here to remark that the school district is obliged by law to build the fence around the school yard and adjoining land owners are not required to build any part of it.

The following cuts will give in a general way the ideas of landscape gardeners as to how a school ground should be arranged and planted. Note especially the grouping of shrubs and trees by themselves and that the shrubbery follows the exterior line of the school lot and screens the outhouses.

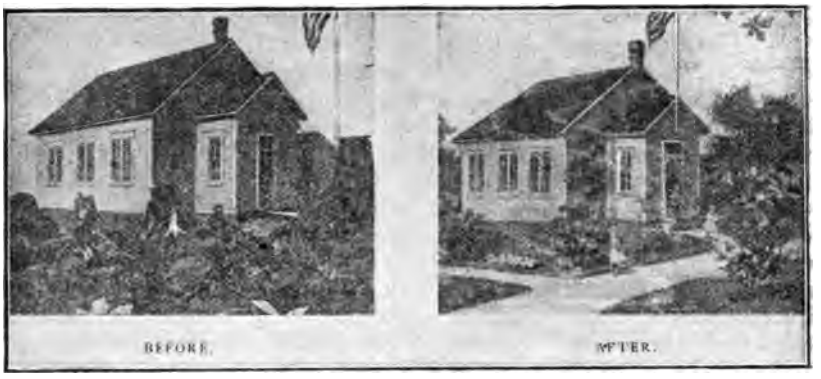

BEFORE.
AFTER.

Fig. 12.


DIAGRAM No. 1.—This illustrates the school grounds after some years' growth, the grounds being originally laid out after the plan shown in Diagram No. 2.

Fig. 13.

Fig. 14

MEANS OF BEAUTIFYING.

The means of beautifying school grounds will vary with locality, character of soil, and drainage. Trees, shrubs, and herbaceous plants may be used, but with all these a large part of the school lot should be a lawn. That part of the yard immediately surrounding the house and in front should be kept as a lawn. The following statement, written by Professor W. J. Beal of our Agricultural College, very tersely states the case and gives valuable suggestions:

"Attempt no grading, except to cut off and fill very slight inequalities, as the chances are that a person who has given little attention to the topic will do crude things—more harm than good. For decoration rely almost entirely on grass, trees, and shrubs. Seed the yard to June grass, using no other crop in the operation. If time will permit, this can be helped by cutting small bits of sod, say two inches across, and rolling down.

Do not scatter shrubs about, but plant in groups of five to thirty, because they will be much more easily cultivated and will look better. Shrubs of a group may in a few cases be all of the same kind. Trees and shrubs should be placed to screen outhouses and woodpiles, and in groups near the margins and in the corners of the school lot. In beginning, the first thing the person of slight experience will think of will be to plant at equal distances in straight lines to balance one tree or group of shrubs by another of the same size and make the plants exactly opposite. Don't do it. Avoid all appearance of planting in rows. Why? Because it is never done, or only to a very limited extent, by persons who have made a specialty of such work, and nature favors curved lines. A curved line is ornamental, a straight line is not. For school grounds, make it a point to plant a good variety of trees and shrubs, that they may be used as object lessons. In this be guided by what kinds are grown on other property adjacent to the school grounds or on the streets near by. If the people of the neighborhood have planted abundantly to sugar maples, elms, Norway spruces, and common lilacs, these may be very sparingly planted about the schoolhouse. To some extent, it will be better to plant liberally to trees and shrubs that are native to the neighborhood, because they are pretty, because they are available almost without cost, because they are apt to thrive, and because they will serve as excellent *object* lessons. The grounds should have a third or more of the ar

destitute of plants, excepting the lawn, for playground. If possible, by all means plant one side or one corner somewhere to a thicket of wild or native plants in great variety, unless, fortunately, such a thicket already exists. If there are many white oaks, or red elms, or other trees, thin here and there to make room for other species. Get someone who knows trees and shrubs to help find these in the neighborhood.

Now for the care,—a portion of the plan usually much neglected. The chances are fifty to one that the trees, bushes and lawn will not receive much care, because the officers of the district think they must economize, because they are not accustomed to giving much, if any, attention to such things at home, and because they do not know how. What shall be done? It is as well to attempt nothing whatever in the way of outdoor planting as to plant once for all time and give no after care. In most cases, there can be found in the vicinity some tidy and observing man or woman who can be hired by the year to look after the school grounds. The district officers know where to look for such a person, because his or her work about the home advertises the fact well. The tactful person so employed should by all means have the opportunity to secure and employ the services of as many school children as she can, with or without pay, assigning definite shrubs or trees to one person.

A lawn mower costs three to five dollars, and its use adds wonderfully to the appearance of the premises. Take good care of it.

Hoe and rake about the groups of shrubs every two or three weeks during all the growing season. Instead of leaving single trees to stand in the grass, where they struggle between life and death for ten years, if life is spared that long, making very slow growth, dig a circle in the lawn for each tree not less than seven feet in diameter, better eight or nine, and hoe when the shrubbery is hoed. This is not only an insurance on the tree, but its growth will delight all who behold, the upper branches often growing two to five feet in a year. After such trees have been well cared for and well started for three or four years, the cultivation may be entirely omitted and grass permitted to grow.

I have purposely said nothing about the cultivation of herbaceous plants. In the thicket referred to, and in the cultivated ground about the shrubs and trees, may be planted "flowers" at pleasure, but *nowhere else*, unless it be to one side or back of the house, no matter if someone thinks they should be in the front yard. Space forbids giving here a book of reasons for the directions given above.

Will it pay? Is it worth while for any school premises to be talked about by all enterprising people who pass with comments: That is pretty; that is nice; that shows enterprise; what an excellent influence such grounds must have on the children who attend school; how proud the teacher must feel to work in such a district; that beats everything I ever saw; that is worth coming ten miles to see; what a contrast between this place and the one in the district we just passed; somebody is doing excellent missionary work, whether she knows it or not; I wish Director ——— of our district could see this place. Perhaps he could learn something, it might stir him up."

PLANTING TREES, FLOWERS, AND SHRUBS.

The man who plants a tree in a proper location becomes thereby a public benefactor. Someone, many years ago, planted the trees that now adorn the streets of our cities and the orchards that furnish us with luscious fruits. A visit to the Michigan Agricultural College will convince one of the possibilities in the way of decorating a plot of ground by means of trees, shrubs, and herbs. If we plant trees we must take a long look ahead if we wish to place them correctly and so that they will bring the greatest benefit to those who are to come after us. We are not to see the small sprout that we plant in the ground, but the beautiful oak or elm that will one day shade the multitude. Ordinarily, small trees four to eight feet high should be selected rather than large ones, as they establish themselves more quickly and are less easily injured by their removal and replanting. It is well for immediate effect to plant trees and shrubs in abundance, then thin them out as occasion requires. Th- -hould be thor-

Size of Trees.

oughly broken and unless already fertile should be mixed with good loam and some fertilizer. The following directions given by the Forestry Division of the Agricultural Department at Washington are most excellent.

"Planting is best done by two or three persons. A, who manipulates the tree, is the planter and is responsible for the results. B and C do the spading under his direction. A places the tree in a hole to ascertain whether this is the proper size; a broad stick laid across the hole aids in judging the depth. Trees should not be set deeper than they were before, except in loose, poor soil. More trees are killed by too deep planting than the reverse. As an illustration of this point it may be stated that trees are frequently killed, without removal, by raising the grade so that the soil is raised about their trunks a few inches higher than before. Valuable trees are frequently destroyed in this way. If the root system is developed sidewise, but not centrally, as is often the case, a hill is raised in the hole to fill out the hollow space in the root system and the earth of the hill is patted down with the spade.

When the hole is in proper order, A holds the tree perpendicularly in the middle of the hole, with the side bearing the fullest branches toward the south or the southeast for better protection of the shaft against the sun. B and C spread the roots into a natural position and then fill in the soil, using the good surface soil first,—small spadefuls deliberately thrown over the roots in all directions,—while A, by a slight shaking and pumping up and down of the stem, aids the earth in settling around the rootlets, which should also be aided by hand and fingers filling in every crevice. A, while setting the tree, must exercise care to keep it in proper position and perpendicular, until the soil is packed so as to keep the tree in place. Then B and C, rapidly fill the hole, A treading the soil firmly down after a sufficient quantity is filled in, finishing off a little above the general level to allow for settling and, finally, placing stones or any mulching around the stem. Do not use water while planting unless it is very carefully applied with a "rose" after the soil is filled in and packed around the fibrous roots. It is not uncommon to see water poured in the hole while it is being filled up. This practice does harm rather than good, for it washes the fine soil away from contact with the roots, leaving empty spaces between the roots, or even leaving, as the water dries and the earth hardens, the little rootlets in the midst of hollows like the inside of pipe-stems. In such a case they cannot touch the earth which gives them nutriment and they die. More trees are killed by too much water in transplanting than by too little. Water after the transplanting is useful, and should be applied during the hot season, the late afternoon or evening being chosen for its application."

In addition to what has here been said it may be well to suggest, also, that if the tree is small and to be moved but a short distance it may be well to let some of the original earth remain about the roots but ordinarily this is not necessary. Improper taking up and undue exposure to sun and dry air kill many trees, or cause them to die after planting. When the hole has been dug for planting the roots care should be taken that the soil underneath the body of the tree be compact and that the roots rest down solidly upon the soil underneath. More trees die because of improper planting than from lack of moisture. Too often the tree is set in the hole and when the earth has settled there is a hollow space underneath its body and the roots which will most surely destroy its life. If the tree has a heavy top part of it should be trimmed off so that the leaf area and root area may correspond. In trimming, some branches should be cut close to the trunk, but most of them should be cut farther out in the top, taking care to cut off the end of a main branch near a smaller branch so as to avoid a conspicuous stub. Forest trees may be best transferred in the early spring before the leaf buds open but evergreen trees may be planted later in the season.

Pruning.

As Professor Beal suggests, an area of from five to ten feet in diameter around each tree should be cultivated for several years after it has been planted.

A row of trees may be planted near the fence surrounding the lot but it would be best not to put them immediately in front of the house, nor should any be planted within fifty feet of the school building, for in after years the shade would interfere with the proper lighting of the schoolroom. Grouped along the side of the lot we may plant shrubs, and as the outbuildings should be placed at the rear of the lot, and usually in the corner, shrubs may be planted about them to serve as a screen.

Location of Trees.

If the schoolhouse is of brick or stone an excellent plan is to plant ivy, clematis, woodbine, or some other clinging vine, so that it may grow upon the walls and thus relieve the bare and bleak exterior and become a real ornament. If the school building is a frame building then the vines should not be permitted to grow upon the building itself but eighteen inches distant, held by wire netting, supported above on the house, or trellises may be erected a short distance from the house on which the vines may be supported. If allowed to grow on the frame building they interfere seriously with the painting of the building and will themselves be seriously injured if torn down every few years to permit repairs. The same care should be given in planting shrubs and vines as is given in planting trees.

Vines.

Trees that grow naturally in the vicinity are best for yard decoration, and the hardy shrubs, such as hydrangeas, mock orange, lilacs, and elders are easily obtainable for further ornamentation. Growing near the margin of the yard a hedge of common wild roses would be very attractive at any season of the year. For the flower gardens, bulbs of crocuses, tulips, and hyacinths may be planted in the fall for early spring blooming, and they are very easily cared for and very effective. Bulbs of such plants as lilies, peonies, and irises once planted will continue to afford an abundance of flowers for several years. For fall flowers the children may plant asters, petunias, phlox, and for climbing plants, sweet peas, morning glories, and nasturtiums. No attempt is here made to give a complete list of flowering plants that may be used as there is a large number to select from.

On the shady side of the building ferns may be planted and they will be a never-ending source of pleasure. On the margins of the lot near the shrubbery it will be an excellent plan to plant some or all of the wild flowers found in the vicinity. Many of these will grow nicely in the shade of the shrubs and trees. The following wild flowers often respond to cultivation with increased size and beauty: the spring beauty, dutchman's breeches, hepatica, anemone, bloodroot, violet, adder's tongue, columbine, and golden rod.

In connection with this it may not be out of place to suggest that there is no reason why in every schoolroom we should not have herbariums, specimens preserved in alcohol, samples of rocks, soils, woods, and minerals, in fact, a cabinet that will produce pleasure and will be exceedingly instructive to the children. All that is needed is a board of education who believe this to be worth *while, and a teacher* who is really alive and possesses sufficient knowledge to make good use of these means for nature study. The

School Cabinet.

rural school teacher, above all others, has an opportunity to use out door and in door object lessons, such as are most appropriate for the best development of the young farmer.

CARE OF SCHOOL GROUNDS.

Under this head it will be proper to say first that it is the duty of the school board to see that the grounds are kept clean and that noxious weeds are not allowed to grow and that everything unsanitary is removed. For the immediate care of the plants and the cultivation of the soil about them the teacher and children may be easily held responsible. The great question that confronts us in this matter is the summer vacation. Who shall see that the lawn is well kept and that domestic animals are not allowed to trespass upon the property? For when young trees and plants have been planted, in case of drouth, they should be cultivated by some one in the manner previously stated. This is the problem that confronts us but its solution is not a serious thing to my mind. It is true that "what is everybody's business is nobody's business," but it will not be difficult if the parents and teachers co-operate to have several committees appointed from the boys and girls before the close of the spring term of school, whose duty it shall be to look after the grounds during the summer. One committee will act during the month of June, another during the month of July, and so on, and the school board of course will see to it that their part is punctually performed. If the children have had a part in planting the trees and plants and if they have received proper encouragement at home in regard to these matters, the terrors of the summer vacation will quickly vanish. And further, if the school ground is made so pleasant and attractive it will be a pleasure and not a hardship for the children and their parents to go there and maintain conditions of beauty and ornamentation. Of course all of these things will not come by chance. No undertaking ever managed to run itself. Somebody must think, somebody must plan, somebody must work, and the burden of the thought and planning and work will be placed upon the shoulders of the school board and the teachers who are really public servants and who ought to be the leaders in all matters of school improvement. It would be impossible to suggest any single plan that would apply in all cases, but there is no reason why we may not see a marked improvement in our school buildings and grounds and in the sentiment of the people toward the schools during the coming years. Many of us have distinct recollections of disagreeable schoolhouses and grounds, of schoolrooms that were actually repulsive, and we owe it to our children to arrange matters so that different impressions will be made on the little people who now venture from home and go to school. Just as we make the parlor the most beautiful room at home in order that our friends may be pleased when they visit us, why not bring together as many attractive things around the schoolhouse as can be brought together? Some will say this is simply a sentiment, but if so, it is a sentiment that will elevate and ennoble childhood and manhood, enrich lives that otherwise would be desolate, and increase the character and value of the citizenship of every community.

Officers. Children's Vacations.

Duty to Our Children.

The following list of trees, shrubs and vines is selected from the varieties at present growing on the grounds of the Michigan Agricultural

College. The common name has been given in as many instances as possible, and the species may be easily obtained from our home forests, or from nurseries. Professor Beal has recommended this list:

TREES.

Acer Negundo L. Box Elder. Ash-leaved Maple.
Acer rubrum L. Red Maple.
Acer saccharinum L. Silver Maple.
Acer saccharum Marsh. Sugar Maple.
Acer saccharum nigrum Britton. Black Maple.
Acer spicatum Lam. Mountain Maple.
Æsculus glabra Willd. Buckeye.
Æsculus Hippocastanum L. Horse Chestnut.
Amelanchier canadensis Medic. June Berry.
Asimina triloba Dunal. Papaw.
Betula alba laciniata pendula Hort. (Cut-leaved Weeping Birch.)
Betula papyrifera Marsh. Canoe Birch.
Castanea dentata (Marsh) Borkh. American Chestnut.
Catalpa speciosa Warder. Hardy Catalpa.
Celtis occidentalis L. Hackberry.
Cercis canadensis L. Judas Tree. Red Bud.
Chionanthus Virginica L. Fringe-tree.
Cladrastis lutea (Michx) Koch. Yellow Wood.
Cornus florida L. Flowering Dogwood.
Cotinus cotinoides (Nutt) Britton. Smoke-tree.
Crataegus Crus-galli L. Hawthorn.
Crataegus macracantha Lodd.
Crataegus punctata Jacq.
Fagus american Sweet. Beech.
Fraxinus american L. White Ash.
Fraxinus nigra Marsh. Black Ash.
Gleditschia triacanthos L. Honey Locust.
Gymnocladus dioica (L.) Koch. Kentucky Coffee-bean Tree.
Hicoria minima (Marsh) Britton.
Hicoria ovata (Mill) Britton. Shagbark Hickory.
Juglans cinerea L. Butternut.
Juglans nigra L. Black Walnut.
Juniperus virginiana L. Red Cedar.
Liriodendron Tulipifera L. Tulip Tree.
Magnolia acuminata L. Cucumber-tree.
Morus rubra L. Red Mulberry.
Nyssa aquatica L. Pepperridge.
Ostrya virginiana Mill. Ironwood.
Picea canadensis (Mill) B. S. P. White Spruce.
Picea excelsa Link. Norway Spruce.
Picea pungens Engelm. Colorado Blue Spruce.
Pinus divaricata (Ait) Sudw. Jack Pine. Gray Pine.
Pinus montana Mughus Willk. Dwarf Pine.
Pinus resinosa Ait. Red or Norway Pine.
Pinus Strobus L. White Pine. Weymouth Pine.
Platanus occidentalis L. Buttonwood Sycamore.
Populus tremuloides Michx. American Aspen.
Prunus americana Marsh. Wild Plum.
Prunus nigra Ait.
Prunus pennsylvanica L. Red Cherry.
Prunus serotina Ehrh. Black Cherry.
Prunus virginiana L. Choke Cherry.
Pyrus Malus L. Common Apple.
Quercus alba L. White Oak.
Quercus cocinia Wang. Scarlet Oak.
Quercus ilicifolia Wang.
Quercus imbricaria Michx. Shingle Oak.
Quercus macrocarpa Michx. Burr Oak.

Quercus Muhlenbergii Engelm. Chestnut Oak.
Quercus nana (Marsh) Sargent.
Quercus palustris Moench. Pin Oak.
Quercus platanoides (Lam) Sudw. Swamp White Oak.
Quercus rubra L. Red Oak.
Quercus velutina Lam. Black Oak.
Robinia Pseud-acacia L. Common Locust.
Rhus hirta (L.) Sudw. Staghorn Sumach.
Salix pentandra L. Laurel-leaved Willow.
Salix. Wisconsin Weeping.
Sassafras Sassafras (L.) Karst.
Sorbus americana Marsh. American Mountain Ash.
Tilia american L. Basswood.
Tilia europaea L. European Basswood.
Tsuga canadensis (L.) Carr. Hemlock.
Toxylon pomiferum Raf. Osage Orange.
Ulmus american L. American Elm.
Ulmus pubescens Walt. Red Elm. *Slippery Elm.
Ulmus racemosa Thomas. Rock Elm.

SHRUBS.

Ceanothus americanus L. New Jersey Tea.
Corylus americana Walt. Hazel-nut.
Cydonia japonica Pers. Japanese Quince.
Euonymus Americana L. Burning Bush.
Euonymus atropurpurens Jacq. Wahoo. Burning Bush.
Hamamelis Virginiana L. Witch Hazel.
Hypericum prolificum L. Shrubby St. John's Wort.
Ilex verticillata (L.) A. Gray. Winter Berry. Black Alder.
Juniperus communis L. Common Juniper.
Lonicera tatarica L. Tatarian Honeysuckle.
Opulaster opulifolia (Benth and Hook).
Philadelphus coronarius L. Mock Orange.
Philadelphus grandiflorus Willd Rhus aromatica Ait. Fragrant Sumach.
Prunus pumila L. Sand Cherry.
Ptelea trifolia L. Hop-tree.
Pyrus coronaria L. Wild Crab Apple.
Rhus copallina L. Dwarf Sumach.
Rhus glabra L. Smooth Sumach.
Ribes aureum Pursh. Missouri Currant.
Robinia hispida L. Rose Acacia.
Rosa acicularis Lindl. A Wild Rose.
Rosa blanda Ait. A Wild Rose.
Rosa lucida Ehrh. Shining Rose.
Rosa setigera Michx. Prairie Rose.
Rubus canadensis L. Blackberry.
Rubus occidentalis L. Black Raspberry.
Rubus strigosus Michx. Red Raspberry.
Sambucus canadensis L. Purple-berried Elder.
Spiraea salicifolia L.
Spiraea Thunbergii Sieb. & Zucc.
Spiraea VanHouttei Briot.
Staphylea trifolia L. Bladder Nut.
Syringa vulgaris L. Common Lilac.
Syringa persica L. Persian Lilac.
Syringa vulgaris alba Hort. White Lilac.
Taxus baccata L. European Yew.
Tecoma radicans Juss. Trumpet Flower.
Thuya occidentalis L. American Arbor Vitae. White Cedar.
Thuya occidentalis Sibirica Hort. Siberian Arbor Vitae.
Viburnum Opulus L. Snowball.
Viburnum acerifolium L. Maple-leaved Viburnum.
Viburnum cassanoides L.